Audit of management of respiratory infections among children

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ABSTRACT

Objective: To study the pattern of drugs prescribing for acute respiratory infections among young children under 5 years and to establish the first step in auditing acute respiratory infections management in two large Primary Health Care Centers in Abha, Asir region.

Methods: Three hundred and thirteen prescriptions of children less than 5 years old were selected randomly and evaluated for: age, sex, nationality, and drugs prescribed in two large Primary Health Care Centers in Abha city, Asir region, Saudi Arabia. The medical records of children who received antibiotics were further evaluated for: process of recording symptoms and signs and appropriateness with diagnosis. Structures of acute respiratory infections care in both Primary Health Care Centers were evaluated in both centers using checklist and scoring system.

Results: Common cold was the most common diagnosis encountered. Antibiotics were the most common prescribed drugs in both Primary Health Care Centers. Less than one third of files revealed appropriate recording of history and physical examination.

Conclusion: There were inadequate structures in both Primary Health Care Centers which negatively affected the process of acute respiratory infections care in both centers. Urgent providing of those structures and establish continuing medical education for the Primary Health Care Center team and health education of the community about acute respiratory infections are two important priorities at both Primary Health Care Centers.

Keywords: Audit, acute respiratory infections, children, prescribing, Primary Health Care Center.

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Acute respiratory infections (ARIs) are one of the most common causes of mortality and morbidity in children under the age of five years in the developing countries.[1-5] Most of those infections are self-limited, viral in origin and do not need prescribing of antibiotics.[5] However, ideal management of this common health problem constitutes a major challenge to PHCCs physicians in absence of specific and sensitive clinical criteria to distinguish viral and bacterial infections, unavailability of quick lab tests, demanding of prescribing antibiotics and other remedies by the parents and relatives, in addition to lack of knowledge about this problem by community and PHCC staff.[5-6] An ARI national program launched in Pakistan showed that using of standard management of ARI succeeded in decreasing case fatality and utilization of antibiotics.[7] The objectives of this paper was to study the patterns of prescribing for ARIs, and to establish the first step in auditing the management of ARIs in two large PHCCs in Asir region.

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Methods. This study was carried out at Wasat Abha and Al-Manhal primary health care centers (WAPHCC & MPHCC) during the month of December 1997. Those two large PHCCs serve about 27,000 inhabitants in Abha city, the capital of Asir region. One fifth of the total population in both centers is below five years old. Each PHCC is staffed by five general practitioners, ten nurses, two pharmacists, one radiology technician, one health inspector, one lab technician and one administrator. The criteria for inclusion in this study were: child who is less than 5 years of age, lives in the catchment areas, his/her file is available at PHCC, and has a clinical diagnosis of ARI. One quarter of the total prescriptions were randomly chosen by table randomization method. Each prescription was evaluated for age, sex, nationality, diagnosis and type of prescribed drugs. Prescriptions which contained antibiotics were further evaluated for the following items: dose, frequency and duration of treatment depending on the national protocol standards.[5] Prescribing was considered as appropriate if all the three items were documented and inappropriate if any item was omitted. Medical records of children who were treated by antibiotics were reviewed and assessed for documentation of symptoms and signs. The correspondence of those symptoms and signs with diagnosis was evaluated by the main investigator. History and physical examination were considered as appropriate if the recorded symptoms and signs were matching the documented diagnosis. The essential structures of ARIs care were assessed by one checklist which was developed by the investigators. The checklist of the essential items of ARI was scored on a three point scale: 2 (if the item was available all the time), 1 (if the item was available sometime), and 0 (if the item was not available at all) (appendix-1). The total score of structures is (16) points. The structures were constituted as adequate if the total score was (>=12 points), and inadequate if the total score was (<12 points). Data were entered into and analyzed by SPSS statistical package program. Appropriate statistical tests were used and considered as significant if (P-value was less than 0.05).

Results. Three hundred and thirteen prescriptions out of 1252 (25%) were evaluated in both PHCCs. One hundred forty-five (46%) were from WAPHCC and 186 (54%) were from MPHCC. The mean number of drugs in those prescriptions was (2.2±0.564). Table 1 shows the characteristics of targeted children. All characteristics of the children in both PHCCs were similar except for nationality. Table 2 displays the distribution of diagnoses in both PHCCs. The most common diagnosis in both PHCCs was common cold which represented about two-thirds of the total diagnoses. Rates of all diagnoses were different between both PHCCs except for bronchitis. There was no single documented case of pneumonia in both PHCCs and no reported cases of otitis media in WAPHCC in the studied sample. Table 3 summarizes the distribution of the types of treatment which were prescribed for ARIs in both centers. Antibiotics were the most commonly prescribed drugs in both PHCCs followed by cough and antihistaminic syrups. There were no significant differences between both PHCCs regarding rates of prescribing all documented drugs except for normal saline nasal drops which were not prescribed at all in any prescription in WAPHCC. Table 4 shows the percentages of completeness of

Table 1 - Profile of children presented with ARIs at WAPHCC and MPHCC.

Characters	WAPHCC (N=145) (%)	MPHCC (N=168) (%)	X^2	P-value
Age				
<one year	33 (23)	49 (29)		
<5>1 year	112 (77)	119 (71)	2.01	0.4
Sex				
Male	76 (52)	82 (49)		
Female	69 (48)	86 (51)	1.38	0.5
Nationality				
Saudi	136 (94)	144 (86)	15.1	
Non-Saudi	9 (6)	24 (14)	3	0.004

WAPHCC-Wasat Abha Primary Health Care Center, MPHCC-Al-Manhal Primary Health Care Center

Table 2 - Distributions of ARIs diagnosis according to PHCC.

Characters	WAPHCC (N=145) (%)	MPHCC (N=168) (%)	Total (N=313) (%)	P-value
Diagnosis				
Common cold	116 (80)	85 (51)	201 (64)	0.00
Tonsillitis/ pharyngitis	15 (10)	40 (24)	55 (18)	0.007
Bronchitis	14 (8)	11 (6.5)	25 (8)	0.8
Pneumonia	0	0	0 (0)	-
Otitis media	0	32 (19)	32 (10)	0.00

WAPHCC-Wasat Abha Primary Health Care Center, MPHCC-Al-Manhal Primary Health Care Center

Table 3 - Distribution of drugs prescribed for children presented with ARIs according to PHCC.

Characters	WAPHCC (N=145) (%)	MPHCC (N=168) (%)	X^2	P-value
Antibiotics	87 (60)	109 (65)	5.63	0.06
Cough syrup	63 (43)	78 (46)	1.09	0.6
Antihistamines	29 (43)	18 (11)	5.45	0.06
Normal saline	0	28 (17)	26.72	0.00
Theophyline	0	9 (5)	0.68	0.41

WAPHCC-Wasat Abha Primary Health Care Center,
MPHCC-Al-Manhal Primary Health Care Center

prescriptions which contained antibiotics (dose, frequency, duration, and appropriateness). Duration of treatment was the most omitted item in prescriptions in both PHCCs. MPHCC was better than WAPHCC regarding all items except for dose. However, there was no statistical significance difference except for frequency and appropriateness. Table 5 summarizes symptoms and signs that were documented in files of children who received antibiotics in both PHCCs. Fever and cough were the most common recorded symptom in WAPHCC and MPHCC. Combined symptoms were recorded in 45% of cases in WAPHCC and 54% of cases in MPHCC. Duration of symptoms was missed in most of the records in WAPHCC and in about two-thirds of records in MPHCC. Regarding otitis media, earache and fever were the most commonly documented symptoms and the duration of symptoms was documented in one third of the cases. Red tympanic membrane was the most recorded sign of otitis media. Appropriate history of ARI was taken in about one third of cases in WAPHCC compared to one fourth in MPHCC. Physical examination, on the other hand, was documented in more than 30% in MPHCC compared to less than 10% in WAPHCC, with significant differences between the two practices ($P<0.05$).

Discussion. This study is the first audit of management of ARIs in both PHCCs. The average number of drugs in each prescription (2.2) is less than that reported in Pakistan, and Sri-Lanka.[8,9] This difference could be due to familiarity of PHCCs physicians with the essential drugs and adherence to recommendations issued by the national quality assurance(NQA).[10] All general practitioners in both centers over-prescribed antibiotics for ARIs. However, the percentages of prescriptions which contained antibiotics in both practices were lower than that reported from different countries.[8,11,12] Cough syrup drugs such as dextromethrphan and antihistaminics such as Chlorpheneramine could be used for releaving cough and rhinorrhea. However, these drugs remain unsafe remedies in the management of ARI especially in children.[13] Nevertheless, we found that 15% of the prescriptions contained antihistaminic and about 45% contained cough syrups without significant difference between the two practices in this regard. Prescribing of normal saline nasal drops for management of common cold is a very encouraging process in MPHCC. This regimen is safe, cheap, effective and could make parents satisfied instead of discharging child without drugs.[5] This simple remedy should be available at each PHCCs in the region. Most of acute bronchitis in children is known to be viral infections. Following up the children, reassurance and health education of parents regarding serious signs and encouraging breast feeding and intake of high calories are the measures that are needed.[5] However, theophylline syrup was prescribed frequently for most of the children suffered from acute bronchitis in MPHCC. Theophylline is not the drug of choice for treating acute bronchitis. It is considered unsafe in the absence of a drug level monitoring, which is not available at PHCC settings. Furthermore, it is not the drug of the first choice in management of mild bronchial asthma which could be misdiagnosed as acute bronchitis.[14] Analysis of prescriptions contained antibiotics revealed that most of them were incomplete particularly for frequency and duration. Those unacceptable defects could be due to work overload on the physicians particularly in the evening periods. Such inappropriate practice is in need for an urgent correction and improvement of the internal quality prescribing system. Appropriate history and physical examination are considered the cornerstone of patients' management. In spite of that fact, analysis of records showed that there was a poor recording process in both PHCCs. The underlying reasons for these defects could be due to work

Table 4 - Frequency and percentage of completeness of prescriptions of antibiotics for ARIs according to PHCCs.

Item	WAPHCC (N=87)	WAPHCC (N=109)	P-value
Dose	100	100	NS
Frequency	70	100	0.000
Duration	28	39.5	NS
Appropriateness	26	40.1	0.04

NS-not significant

Table 5 - Profile of history and examination of children who presented with ARIs and received antibiotics at both centers.

History of cases diagnosed as ARI	WAPHCC (N=66)	MPHCC (N=98)	P-value
Fever	34 (51.5)	19 (19)	0.001
Sore throat	1 (1.5)	0 (0)	0.55
Cough	2 (3)	23 (23.5)	0.000
Presented with more than one symptom	29 (45)	53 (54)	0.000
No symptoms written	0 (0)	3 (3)	NS
Duration of symptoms	2 (3)	36 (37)	0.000
Examination of cases with ARI			0.000
			0.000
Exudate on throat	0	16 (16)	NS
Temperature (>38)	26 (39)	15 (15)	NS
Tender anterior cervical lymph nodes	0	2 (2)	-
More than one sign	0	2 (2)	-
History of case diagnosed as Otitis media	WAPHCC (N=0)	MPHCC (N=21)	
Ear pain	-	10 (48)	-
Fever	-	7 (33)	-
Ear discharge	-	1 (5)	-
Presented with more than one symptom	-	3 (14)	-
Duration of symptoms	-	7 (33)	-
Examination of cases with otitis media			
Ear Discharge	-	1 (5)	-
Red tympanic membrane	-	18 (86)	-
More than one signs	-	2 (10)	-
Appropriate history of all ARI cases	26 (39)	23 (23.5)	0.07
Appropriate examination of all ARI cases.	8 (12)	35 (36)	0.0001

NS-not significant

overloads, and lack of medical record auditing and quality assurance system. Assessment of structures of ARI revealed deficiencies in most of the essential structures in both centers except for adequate physicians' number and essential drugs. These two structures are considered as the most important resources for the improvement of the ARIs care. The other unavailable structures could be easily improved by optimizing the training of physicians and community health education.

In conclusion, this audit showed that there were irrational prescribing for children presented with ARIs, poor recording process, lack of management protocol and auditing system. Urgent interventions such as evaluation of the knowledge and attitudes of PHCCs physicians, training of physicians, providing PHCCs with national protocol for ARI, auditing and health education of community regarding proper management of ARIs are essential to overcome this problem.

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Appendix 1 - Availability of essential structures for optimal ARI care at WAPHCC and MPHCC.

Items	**WAPHCC**	**MPHCC**
Primary health care physicians attended training course in ARI	0	0
Availability of essential drugs		
Penicillin-V/Amoxicillin	0	0
Erythromycin/cotrimoxazole	2	2
Normal saline nasal drop	2	2
	0	2
Availability of health education material (Posters, pamphlets)	0	0
Number of physicians proportionate to the population	2	2
Availability of protocol for ARI management	0	0
Presence of internal quality system for ARI	0	0
Total Score	6	8

WAPHCC-Wasat Abha Primary Health Care Center,
MPHCC-Al-Manhal Primary Health Care Center
*Scale:0=not available at all, 1=available most of the time, 2=available all the time