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Prevalence and Predictors of Antibiotic use among Children Acute Viral Gastroenteritis Attending the Primary Health Clinics in Makah city in Saudi Arabia 2022

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Abstract

Inappropriate use of antibiotics in human and animal is one of the causes of antimicrobial resistance. This study evaluates the prevalence and predictors of antibiotic use among pediatric patients primary health clinics in Makah city in Saudi Arabia. The World Health Organization has identified antibiotic resistance as a major threat to global public health security . Antibiotic resistance causes significant morbidity, mortality, and healthcare cost. In the Saudi Arabia, two high antibiotic-resistant infections are reported resulting, deaths and a lot of billion loss every year . With the Budgeting Application Instruction, which entered into force in 2003 for controlling antibiotic use, approval of an infectious disease specialist (IDS) was required for use of some differences in antibiotic knowledge and attitudes between parents of Medicaid-insured. It is unknown whether understanding has improved and whether previously identified differences persist. In Europe, infections caused by antibiotic-resistant pathogens lead to approximately 25,000 deaths and an estimated €1.5 billion economic loss each year . Aim of the study: To assessment of prevalence of antibiotic use for pediatric acute viral gastroenteritis attending the primary health clinics in Makah city in Saudi Arabia 2022. Method: This is a cross-sectional study, thirty questions of children years of age who had suffered from acute gastroenteritis during the March to June, 2019 was conducted attending the primary health care

centers in Makkah, Saudi Arabia. our total participants were (80). Results: Oral antibiotics were preferred by 45.0% followed by intravenous route (30.0%), and intramuscular route in 8.75%. Antibiotics less than week were prescribed in about 43.0%. Conclusion: must be Antibiotic use based on consultation with an infectious diseases specialist decreased inappropriate antibiotic use. Acute gastroenteritis is a major source of morbidity and mortality among young children in developed and developing countries. Enter pathogenic viruses are regarded as particularly relevant causative agents.

Keywords*: Assessment, Prevalence, Antibiotics, Gastroenteritis, Pediatric, primary health clinics, Makah.*

Introduction

Acute gastroenteritis is a common disorder in young children. The associated dehydration is a leading cause of admission to hospital in industrialized countries and a major source of mortality in developing countries. Enteric viruses have been recognized as the most important etiologic agents of the disease [1] and four categories of viruses are being considered as relevant: Group A rotavirus (RoV, family Reoviridae),Norovirus(NV, family Caliciviridae), adenovirus 40/41 (AdV, subgenus F) and astrovirus (AstV). Rotavirus is acknowledged unanimously as the major cause of severe diarrheal illnesses of infants and children worldwide. Data on the relative importance of the other agents as pediatric pathogens depend on variants such as the diagnostic assay or the geographical setting chosen [2]. Acute gastroenteritis (AGE) is one of the most common problems in infants and young children throughout the world. It is caused by viral, bacterial, and parasitic agents, with an age-, host-, and location-based pattern. Commonly its caused by virus, such as rotavirus and enteric adenovirus, which is in most cases tend to be mild and self-limiting fashion, There are no clear indications for antimicrobial therapy; however, antibiotics are frequently prescribed children younger than 5 years old.[3,4]

Rotavirus account for the majority of the illness, and being the most cause of acute diarrhea .Each year, rotavirus causes approximately 500,000 to 870,000 deaths in childhood <5 years of age. The tremendous incidence of rotavirus disease underscores the urgent need for interventions, such as vaccines, to prevent childhood deaths in developing nations. However hard evidence of rotavirus-induced mortality is difficult to obtain. [5].

Efforts to reduce antibiotic misuse and overuse are necessary to curb additional increases in antibiotic resistance.1–4 The United States saw decreases in antibiotic use for children during the last 2 decades, likely because of combined benefits of new professional guidelines, educational campaigns for patients and professionals, and introduction of new vaccines.[6,7] Although recent studies demonstrate that antibiotic use has decreased and perhaps leveled off, additional reductions in use and improvements in antibiotic selection are believed possible.[8,9].

On the other hand, recent studies have shown that the incidence may be decreased. Karahocagil et al., (2005) [10] found that the incidence of rotavirus infections had decreased (10%) in the city of Makkah in 2005. Although a comparison study was made for the incidence in Saudi Arabia by reviewing of 22 studies published between 1982 to 2003 and concluded that HRV remains the most common cause of diarrheal infection in infants and young children, leads to high morbidity in both developing and developed countries, including Saudi Arabia .[11]

The first step for managing any patient with diarrhea is to determine the severity of dehydration according to the estimated volume loss and the symptoms and signs noted on physical examination. children are managed differently. Oral rehydration is recommended to alleviate mild dehydration, which often

causes minimal to no signs or symptoms Although not always clinically apparent, volume deficiency is still present to a small degree because of fluid loss through diarrhea. at home. However, a few complicated cases may require antimicrobial therapy because the severity of the clinical picture. [12]

Literature Review

Studies performed to assessment of Prevalence of Antibiotic Use for Pediatric Acute viral Gastroenteritis attending the primary health clinics very few.

In the study conducted by Mangen et al.[13] in a children's hospital, inappropriate antibiotic use was found as 12.9% in pediatric wards, whereas it was 57.1% in pediatric surgery wards. Inappropriate antibiotic use was found with a rate of 40.7% in a study conducted[14]. in a university hospital and as 49% in a study [15]. In an education and research hospital. In our study, we found inappropriate antibiotic use at a rate of 33.8% which was similar to the literature.[16]

Mitui, et al reported inappropriate antibiotic use may show variance in different divisions or wards of the same hospital. Studies have shown that inappropriate antibiotic use occurs more frequently in surgery wards compared with internal medicine wards[17]. Molecular characterization of a human group C rotavirus detected first in Turkey. Virus Genes, [18].priate antibiotic use has been reported with a high rate in pediatric intensive care wards. However, we found that the rate of inappropriate antibiotic use was lower in the intensive care ward [14].

in contrast to the literature. This may be related with the higher rate of obtaining samples for culture and higher rate of consultation with the division of infectious diseases in intensive care.

In some country, the use of broad-spectrum antibiotics was limited with antibiotic prescription rules included in the Budgeting Application Instruction which entered into force in 2003[19]. In the study conducted[20], the rate of inappropriate antibiotic use was found to be statistically significantly lower in patients for whom consultation was requested from the division of pediatric infectious diseases.

Rationale:

Differences in antibiotic knowledge and attitudes between parents of children have been previously reported. It is unknown whether understanding has improved and whether previously identified differences persist. Among the factors contributing to pediatric prescribing, parental attitudes and knowledge about common childhood illnesses may lead parents to mistakenly believe antibiotics are needed particularly for gastroenteritis, the most common indication for antibiotics among young children. till there are no enough studies to measure the prevalence of antibiotic use among infants and children with acute viral gastroenteritis especially in the primary health clinics in Makah city.

The aim of the study:

To assessment of prevalence of antibiotic use for pediatric acute viral gastroenteritis attending the primary health clinics in Makah city in Saudi Arabia 2019 .

The objectives:

- To assessment of prevalence of antibiotic use for pediatric acute viral gastroenteritis attending the primary health clinics in Makah city in Saudi Arabia 2019 .
- To reduce the need for antibiotics, lower resistance and improve the antibiotics targeting among pediatrics population in Makah city in Saudi Arabia

Methodology

Research Design

This is a cross sectional study. sampling technique has be used then simple random

Study sample:

Responded questionnaire from 80 perticipent of perant of children under 6years of age who had suffered from acute gastroenteritis in Makah city in Saudi Arabia.

Inclusion criteria:

The sample represents parents of children under 6 years of age which had acute gastroenteritis.

Exclusion criteria:

no exclusion criteria

Study tool:

For the purpose of assessing the Prevalence of Antibiotic Use for Pediatric Acute viral Gastroenteritis in Makah city KSA, A well-structured questionnaire was developed by the researchers to ease the computation of the score of knowledge. The questionnaire consists of thirty questions covering socio-demographic data, descriptive data, and questions assessing the knowledge of seasonal spreading of the disease ,reasons and extent of antibiotics prescribing ,awareness of family's about of the antibiotics use, cases.

Procedure: Study was approved by Research Ethics Committee in Makah city .

Dependent variable: Overuse of antibiotic on children.

Independent variable: Age of children.

Study outcomes and measurements:

Extent of Awareness of parents regarding the overuse of antibiotic in cases of viral gastroenteritis in pediatric.

Data analysis

Data will be collected using a questionnaire and Data entry and analyses of results will be done using the Statistical Package for Social Sciences (SPSS) ver 2 for Windows software. Descriptive statistics such as mean and standard deviation (SD) for continuous variables and frequency and percentage for categorical variables will be determined. Inferential statistics will then be followed using parametric and non-parametric test for univariate analysis. The level of significance is set at $p< 0.05$.

Result

Table (1): distribution of the demographic to participant in the study (n-80)

	N	%
Age		
<35	28	35
34-45.	25	31.25
45-55	18	22.5
>55	9	11.25
Gender		
Female	53	66.25
Male	27	33.75
Specialty		
ER physician	8	10
Family physician	20	25
General practitioner	16	20
Pediatric physician	15	18.75
Other	21	26.25
Years of experience:		
<5	18	22.5
5-10.	24	30
10-15.	16	20
>15.	22	27.5
Institution		
AHUD	3	3.75
NGH	8	10
MCH	9	11.25
PHC	18	22.5
Other	42	52.5

Table (1): demographic distribution of our study's data. The majority of participants female were (66.25%). (31.25%) of participants were between 34-45 years. Regarding the specialty the majority of participant Other were (26.25%) but family physicians were (25.0%) and general physicians were (20.0%) regarding the Years of experience the most constituents of study between (5-10)were (30.0%) followed by >15 were (27.5%) regarding the Institution our study Other were(52.5%) followed by PHC which was institution of that physician by (22.5%)

Table (2) distribution of the pediatric age group, number of cases per week, investigating the cause of treatment of gastroenteritis , stool checkup was the most indication for which antibiotics , Indications for using different kind of antibiotic

	N	%
Pediatric age groups that you're dealing with		
Newborn 0-27 days	26	32.5
Infants & toddlers 1-23 months	48	60
Children 2-11 years	60	75
Adolescents 12-18 years	44	55
How much do you treat cases of pediatric viral gastroenteritis per week?		
0-5 cases.	42	52.5
6-10 cases.	18	22.5
10-20 cases.	8	10
More than 20 cases.	12	15
When are you treating cases of viral gastroenteritis with antibiotic?		
For all cases of gastroenteritis.	5	6.25
For cases that presented to Emerging room	9	11.25
For cases that admitted to hospital.	16	20
For cases that developed complication	41	51.25
For cases that exceeding the usual period of the disease.	20	25
If the patient's parents, ask for antibiotic.	5	6.25
Other	24	30
Which factors you depend on for prescribe antibiotic or not ?		
Temperature	16	20
Blood in stool	15.2	19
Blood checkup	17.6	22
Stool checkup	24	30
Other	7.2	9
If you are using different types of antibiotic, why?		
None	8	10
According to the age of the patient	15	18.75
According to the patient condition & its severity.	42	52.5
Other	15	18.75

Table (2) : pediatric age group that study individuals dealing with. Children between 2-11 years were presented in 75.0%. Infants & toddlers 1-23 months were 60.0% . Newborn 0-27 was treated by (32.0%). Adolescents were treated by 55.0% .Regarding our study individuals, number of cases per week, in 52.5% of study individuals, 0-5 case per week were consulted. 22.5% of study individuals consulted 6-10 pediatric cases. 10.0% of individuals gave been consulted by 10-20 cases per week. Those who have been consulted for more than 20 children per week were 15.0%, investigating the cause of treatment of gastroenteritis showed that prescribing of antibiotics was added if cases developed complications in 51.25%. Second indication for cases that exceeding the usual period of the disease in 25.0% of cases.

For cases that presented to Emerging room were represented 11.25% of cases, while other were 30.0%, regarding factors you depend on for prescribe antibiotic or not the Blood checkup was the most prevalent after stool checkup in 222.0% of cases. In 30.0% of cases, presence of blood in stool was the indication for prescribing antibiotics. Temperature was as indication in 20.0% of cases.

Regarding the using different types of antibiotic, why the most of participants patient condition and severity in 52.3% of cases. According to age of patient was the second factor in 18.75% of patients. No identified cause was seen in 10.0% .

Table (3) distribution of the Indications for treating acute viral gastroenteritis, prevalence of most common route preferred by the study individuals, duration of antibiotics course in study individuals, questioning about the seasonal break out of viral gastroenteritis, questioning about necessity for hospital admission among study individuals, Reason for hospital admission

	N	%
Why are you often treating viral gastroenteritis with antibiotic?		
To satisfy the patient's parents.	5	6.25
To prevent secondary infection.	36	45
Because you think this is better according to your experience.	8	10
This is the usual routine in your institution.	26	32.5
Other	5	6.25
How to administer the antibiotic?		
Non	2	2.5

Via IM	7	8.75
Via IV	24	30
Orally	36	45
Other	11	13.75
What is the duration of antibiotic scours?		
Non	5.6	7
Less than one week	34.4	43
7 to 14 days	16	20
Three weeks	2.4	3
30 days	3.2	4
More than one month	18.4	23
In which season do you think viral gastroenteritis increase?		
I don't know	5	6.25
Summer	44	55
Winter	19	23.75
Other	12	15
Do you think that most of the cases of viral gastroenteritis need to be admitted in hospital?		
No	55	68.75
Yes	25	31.25
if the answer is yes, what are the reasons?		
Severe dehydration	8	32
Severe vomiting or diarrhoea	12	48
Non-response to medication	3	12
Other	2	8

Table (3) Indications for treating acute viral gastroenteritis frequently . In 45.0% of individuals, usage of antibiotics was to prevent secondary infection. Misleading thinking about good practice was recorded by 10.0% individuals. Usual routine of prescription was recorded by 32.5%. Un-identifiable causes were recorded in 6.25% of cases.

Prevalence of most common route preferred by the study individuals . Oral antibiotics were preferred by 45.0% followed by intravenous route (30.0%), and intramuscular route in 8.75%.

Duration of antibiotics course in study individuals . Antibiotics less than week were prescribed in about 43.0%. Duration from 7-14 days was recorded by 20%. Long-term antibiotics were prescribed by 3.0%. Questioning about the seasonal break out of viral gastroenteritis as stated by study individuals . Summer was the most common season for viral infection endemic infection as stated by 55%. Winter was stated as the second most common season in 23.75%. 6.25% of physicians stated as don't know.

Questioning about necessity for hospital admission among study individuals . 68.75% of study individuals say 'No' and 31.25% of them say 'yes'.

Regarding if the answer is yes, what are the reasons most of participant severe vomiting or diarrhea were 48.0% followed by severe dehydration were (32.0%)

Table (4): the cases need to be treated by antibiotic, Extent of medical, changing antibiotics treatment , extent of parents' awareness or patients' awareness , explain why prescription of antibiotics , the effect of being relative to patients and possibility to change physicians , relatives' inquiry and insist about giving antibiotics in viral gastroenteritis. Family 'accepted' treatment regime without antibiotics. Improvement in cases that are taken antibiotics

	N	%
Do you think that most of the cases need to be treated by antibiotic ?		
No	74	92.5
Yes	6	7.5
The extent to which your medical description of antibiotics depends on :		
Age of the patient	13	16.25
worsening of symptoms	23	28.75
investigation	26	32.5
Other	18	22.5
Has your treatment of viral gastroenteritis cases by antibiotics changed over the past few years after studies that have shown the risk of using them; or is it still the same?		
Yes, changed	30	37.5
No, Still the same	32	40
Other	18	22.5
Through your experience with cases of viral gastroenteritis, the extent of the "awareness" of the patient's parents or the patient himself about the importance of not taking antibiotics except for necessity is?		
High	12	15
Average	35	43.75
Low	33	41.25
Do you have difficulty explaining to the patient's parents or the patient himself about the importance of not describing antibiotics unless it is necessary?		
No	42	52.5
Yes	38	47.5

In case there was one of your relatives or your family that has viral gastroenteritis, does this effect the way of your treatment?		
No	62	77.5
Yes	18	22.5
In case there was one of your relatives or your family that has viral gastroenteritis, and he insists that you give him an antibiotic. What is your behaviour in this case?		
You will give him the appropriate antibiotic	10	12.5
You will explain to him the seriousness of antibiotics in cases where they are not needed	62	77.5
You will Oversees the case and decides whether to give him or not	20	25
The acceptance of patient's family to the treatment without antibiotics in these cases ?		
Very accepted	8	10
Accepted	44	55
Rejected	17	21.25
Very rejected	11	13.75
Is there improvement in cases that are taken antibiotics from other ?(shorten of disease state)		
No	44	55
Yes	36	45

Table (4): 7.5% of study participants answered ‘yes’ to admission of antibiotics in treatment of acute viral gastroenteritis. 92.5% of participants said ‘no’ to admission of antibiotics.

Extent of medical description in our study is depending on investigation as stated by 32.5%. 28.75% of participants regarded worsening of symptoms can change the antibiotics. Age of patients was a factor as stated by 22.5%. Un-identified causes were stated by 16.25%.

Questioning about changing antibiotics treatment according to recent studies showed risks of introducing antibiotics in acute viral gastroenteritis. 40.0% of participants said ‘yes’. 37.5% said ‘no’ to change mind after studies. 22.5% of participants said ‘other’.

Extent of parents’ awareness or patients’ awareness for antibiotics in acute viral gastroenteritis. 43.75% of participants said ‘average’. 41.25% of participants said ‘low’ awareness while 15.0% of them said ‘high’. 52.5% of participants faced difficulty to explain why prescription of antibiotics in acute viral infection is prohibited. 47.5% of study participants said ‘no’ difficulty. (22.5%)of participants said ‘yes’ to an answer about the effect of being relative to patients and possibility to change physicians mind. 77.5% of study participants said ‘no’ to that question

Questioning about relatives’ inquiry and insist about giving antibiotics in viral gastroenteritis. 77.5% of participants said they will explain to relative about seriousness of antibiotics. 25.0% of participants will oversee the case again. 12.5% of participants said they will give an appropriate antibiotic. (55.0%)of participants said that family ‘accepted’ treatment regime without antibiotics. 21.0% of them suggested rejection to such plan of treatment. 10.0% of study participants said they will be very accepted. 3.6% of participants think that family will disagree with such regime.

(55.0%) of study participants said that admission of antibiotics in acute viral infection was not associated with shortening of disease state. 45.0% of study participants saw improvement in patient condition after addition of antibiotics.

Discussion

Resistances to antibiotics are emerging dilemma. In poor countries we find resistance between pathogens is successful is less restricted and less supervised [21,22]. In developing countries, recommendations for acute diarrhea Enteric pathogens have developed resistance to virtually all antibiotics routinely used in the treatment of diarrhea . [23.24]Acute gastroenteritis AGE is more common in infants with the highest incidence in the older infants. Fever and vomiting are the most common associated symptoms. Infections may be bacterial, viral or parasitic origin cause of AGE among the children. [25,26]. In the government sector, antibiotics were described as 23% for children only, while doctors in the government sector were 51% of children with diarrhea.[27] in high-level scientific and physical countries, the physician’s reactions and expectations to patients were deriving for inappropriate use of antibiotics. However, in 10% of children admitted, inappropriate use of

antibiotics because of “probable bacterial pathogen. [28]

For considering antibiotic treatment contain clinical features, host-related and setting-related conditions, and etiology.[29] In the treatment of diarrhea, Stool output was calculated as the sum of the weights of the watery and loose stools (diarrheic stools) divided by the body weight at base line[25]. Rehydration is the role therapy for AGE, and active management of diarrhea with diosmectite or probiotics should be respected, out of etiology.[27,30]

Conclusion

In conclusion, inappropriate antibiotic use is frequently observed in many hospitals. Intermittent point- prevalence studies are helpful in terms of demonstrating possible problems related with antibiotic use and taking necessary precautions. It is clear that use of antibiotics according to consultation with the division of infectious diseases is a variable that decreases the frequency of inappropriate antibiotic use.

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