

Acute Gastroenteritis Among Indigenous Paediatric Patients – A Descriptive Study in a Rural District Hospital, Sarawak

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ABSTRACT

Introduction: Acute gastroenteritis (AGE) is one of the frequent causes of hospitalization in children under the age of five, particularly in a rural setting. This study was conducted to determine the epidemiology of acute gastroenteritis in indigenous children admitted to a rural district hospital in Sarawak. **Methods:** A retrospective review of indigenous paediatrics cases of acute gastroenteritis admitted to the ward of Serian District Hospital, a rural district hospital in Sarawak, between the years 2006-2007. The data was collected from the patients' case notes, obtained with permission from the hospital management. Data was entered and analyzed using SPSS version 16. **Results:** During the study period, 234 indigenous children with acute gastroenteritis were admitted with the highest prevalence in 2006 (53.4%). The findings showed higher prevalence was found in children aged 3 years and below (76.5%) and male (56.4%). The minimum duration of hospital stay is 1 day, and the maximum stay is 5 days. The clinical findings showed that the majority of the cases presented with vomiting, diarrhea, dry mouth and tongue, sunken eye, with the majority (76%) reported having mild dehydration. The most common treatment used is oral rehydration solutions (85.4%), followed by intravenous bolus or drip (82.3%), paracetamol (79%) and antibiotic (36.2%). Peak incidence of admissions was between November to January. About 38.5% of the AGE cases admitted were found to be underweight (weight-for-age below -2SD). **Conclusion:** The findings indicated children aged 3 years and below are the most vulnerable to AGE and malnutrition could be one of the predisposing factors. The peak incidence during the raining season at the end of the year indicated a possible relationship between AGE and seasonal type of virus infection. Prevention in the form of proper hygiene at the household level probably will prove to be useful.

Keywords: Acute gastroenteritis; indigenous; children; Malaysia

INTRODUCTION

Acute gastroenteritis (AGE) is one of the frequent causes of hospitalization in children under age of five in the hospital setting, both in Malaysia and throughout the world, especially in developing countries^[1, 2]. It is estimated that approximately 440,000 annual deaths in children <5 years of age worldwide are due to diarrhea related illnesses, with rotavirus as the main cause^[1]. Due to the inability to cope with greater body fluid loss and immature renal tubular re-absorption process, children tend to face greater risk of being critically ill and their illness can cause death or irreversible prognosis^[3]. Recent studies suggest that as global deaths from childhood diarrhea decreased during the past 2 decades, the proportion of hospitalization due to diarrhea may have not changed much. In fact, the mortality caused by this disease contributes significant health costs to the government. This is reflected in a recent study by Lee *et al.*^[2] who estimated that the financial burden of providing inpatient care for rotavirus GE in Malaysian children was US\$1.8 million (range US\$0.6 million 7.5 million) annually. The findings further revealed that the median cost of providing inpatient care for an episode of rotavirus GE was US\$211.91 (range US\$68.50–880.60). This figure is rather high as compared to per capita health expenditure provided by the Malaysian Government in 2002 – US\$71.47.

In view of the importance of understanding the epidemiological aspect of AGE, this report aims to establish a preliminary profile among the indigenous AGE cases reported in the paediatric ward in a rural district hospital in Sarawak. The report describes the information obtained from the case notes over a period of 2 years from 2006-2007.

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MATERIALS AND METHODS

The study was conducted in the Serian District Hospital, located 1.6 km from Serian, a town and the capital of the Serian District in Samarahan Division, Sarawak. It is located about 65 km from Kuching, the capital of Sarawak. The population as reported in the year 2000 population census was 84,800 with 65% of the population being Bidayuh, followed by Iban, Chinese and Malay. Serian District Hospital has a serving history of 32 years with 84 beds. The paediatric ward consists of 34 beds.

Data on indigenous AGE cases in the paediatric ward of Serian District Hospital from the year 2006-2007 was obtained from the Medical Record Section of the hospital. A prior permission was obtained from the hospital management and all information was treated with confidentiality. All the cases included in this study were of children 12 years old and below. Information obtained from the case notes consisted of patients' details on admission, age, gender, race, weight during admission, duration of hospitalization, presenting signs and symptoms, investigation findings and management of patients. Categorization of anthropometry status in the form of z-score was based on World Health Organisation (WHO) Anthro version 3.01^[4] for 0-60 months. For classification of age group ranged from 5-10 years, 2007 WHO Reference^[5] was used. Between 10-12 years old, CDC growth charts 2000^[6] were used.

All data was entered and analyzed using Statistical Package for Social Science (SPSS) version 16. Descriptive analysis was done and presented in various forms.

RESULTS

Between the 1st of January 2006 and the 31st of December 2007, 234 children (0.08-11 years) were hospitalized in the paediatric ward due to AGE. The length of hospitalization ranged from 1 to 5 days, with a mean of 1.86 ± 0.93 days. Approximately 39.7% of patients stayed in the hospital for 1 day, whereas 0.9% stayed for 5 days. Of these, 56.4% were boys and 70.9% were Bidayuh. Approximately 14.1% of the AGE children were severely underweight (<-3SD). Information on characteristics of the patients is presented in Table 1.

Table 1 : Information on Patients (n=234)

	No	%	Mean	Range
Age (year)				
0-0.5	19	8.1	2.45	0.08-11
0.6-3	160	68.4		
4-6	39	16.7		
7-9	12	5.1		
10-12	4	1.7		
Male				
Male	132	56.4		
Female	102	43.6		
Race				
Bidayuh	166	70.9		
Iban	68	29.1		
Duration of Hospitalization (day)				
1	93	39.7	1.86	1-5
2	93	39.7		
3	37	15.8		
4	9	3.8		
5	2	0.9		
Weight-for-age				
Severe Underweight (<-3SD)	33	14.1		
Moderate Underweight (<-2SD)	57	24.4		
Mild Underweight (<-1SD)	76	32.5		
Normal	68	29.1		

The most common admission month was from November to January (15.0 – 17.9%), and admission rates was lowest in March and April (2.6% each). The details are presented in Figure 1.

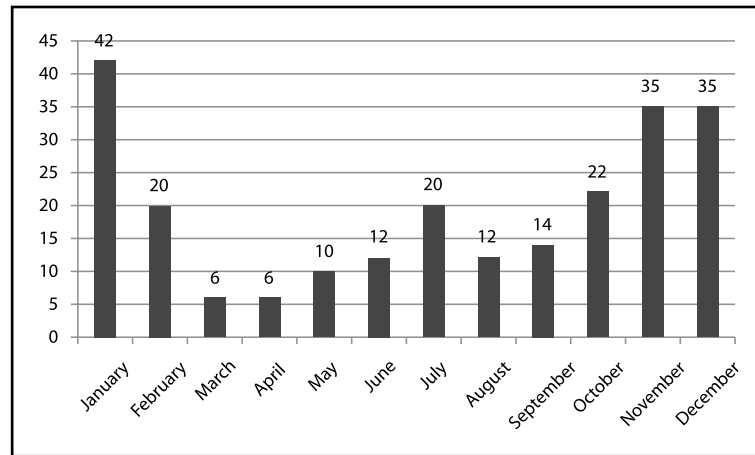


Figure 1 : Number of Acute Gastroenteritis cases according to Month

The distribution of signs and symptoms during the admission are presented in Table 2. Sunken eye, dry mouth and tongue were the most common signs. Most of the patients (85.2-89%) complained of diarrhea and vomiting during the admission. The majority of the patients (79-85.4%) were treated with oral rehydration salt, IV bolus/drip and paracetamol. Only one third (36.2%) were given antibiotic, possibly the cases were due to bacterial infections. Based on the signs and symptoms of dehydration, the physical examinations revealed that the majority (73.9%) of patients had mild dehydration, and 26.1% had moderate or severe dehydration.

Table 2 : Signs and Symptoms of the AGE cases and type of treatment (n=234)

	No	%
Signs		
No signs of dehydration	57	24.4
Drowsiness	53	22.6
Sunken eye	67	28.6
Dry mouth and tongue	67	28.4
Tachypnoea / tachycardia	39	16.5
Reduced skin turgor	30	12.7
Symptoms		
Diarrhea	199	85.2
Vomiting	208	89.0
Fever	140	59.9
Poor oral intake	141	60.4
Treatment		
ORS	200	85.4
IV bolus or IV drip	193	82.3
Paracetamol	185	79.0
Antibiotic	85	36.2

Table 3 : Severity of the AGE cases (n=234)

Severity	No	%
Mild dehydration	173	73.9
Moderate dehydration	50	21.4
Severe dehydration	11	4.7
Total	234	100%

DISCUSSION

The findings of this study indicated that the majority of the AGE patients were from age group 3 years and below, consistent with other studies done in Singapore^[7], New Zealand^[8] and Italy^[9] where the majority of the AGE rotavirus related hospitalization were from the same age group. The most affected age group was those from 6-23 months. This finding is consistent with a study done in urban area in Malaysia^[10]. Those who were below 6 months were less affected probably due to protective effect of maternal antibodies in infants^[11] and the antibody obtained from breastfeeding^[12]. As for gender, there was only a slight difference between male and female, although studies have shown mix difference between the groups^[13].

In terms of nutritional status, more than two third of the AGE cases were reported to be underweight. It is known that the interaction between malnutrition and infection is the leading cause of morbidity and mortality in children^[14]. Infections, particularly AGE can make malnutrition worse and poor nutrition can increase the severity of infectious disease. As the findings were based on the case report at the point of hospital admission, the relationship between malnutrition and infection is inconclusive.

Unlike a study done locally by Hung *et al.*^[10], this study shows that the greatest burden of AGE was between November to January (raining season) - a seasonal pattern. Another study done in urban area in Malaysia, showed peak incidence of admissions was between January to March, and September to October^[14]. Evidences done in other countries indicated only regions with a temperate climate have a seasonal pattern^[8,9], and usually the admissions occur more in late winter and early spring. Nevertheless, this is a potential area for further study.

The most common signs and symptoms of AGE in this study were similar with other studies^[8,9]. The main limitation of this study is comparison between children with and without rotavirus infection cannot be done as such information was not available in the medical records. Other studies in Malaysia have shown that Rotavirus was the commonest pathogen identified for the causes of AGE in young children^[14,15,16]. Studies^[8,9] have shown that children with rotavirus-positive AGE were more likely to have dehydration as compared to those who are rotavirus-negative. This is common as rotavirus-positive AGE cases are considered as a more severe form of illness^[8,9]. In terms of severity of dehydration, 24.2% of the children in our study had moderate or severe dehydration on admission. This is rather consistent with another study done in an urban area in Malaysia where 17% had moderate or severe dehydration and the commonest pathogen are rotavirus^[15]. In term of management of AGE in the district hospital, the mean duration of stay of 1.86 days is slightly shorter than studies done in other urban hospitals in Malaysia^[14,17]. This could be due to the fact that cases admitted to a rural district hospital may be less severe compared to cases admitted to a tertiary hospital. For the treatment with intravenous fluid therapy, 85.4% of patients received intravenous fluid therapy which is consistent with other studies in Malaysia^[15]. Antibiotic were prescribed in 38.5% of the patients in our study. Although we do not have information on the type of pathogen involved in this study, most cases of acute gastroenteritis in children are viral, self-limited, and need only supportive treatment. Antibacterial therapy should be restricted to specific bacterial pathogens and disease presentations^[18]. However, empiric therapy may be appropriate in the presence of a severe illness with bloody diarrhea and stool leucocytes, particularly in infancy and the immunocompromised^[18].

The limitation of this study is that only children seeking healthcare at the district hospital were included. Therefore generalization of these findings cannot be applied to others who seek treatment elsewhere. In a district hospital setting, many clinicians do not depend on stool investigation or rapid antigen detection for diagnosis. Only during an outbreak or when patients present with bloody diarrhea and high fever, such tests are done. Therefore, information on types of pathogen involved in this study was not available for further analysis.

In conclusion, this study has clearly demonstrated that AGE cases in indigenous children are compatible to their non-indigenous peers in urban setting. One common finding indicated that children aged 3 years and below are the most vulnerable to AGE and malnutrition could be one of the predisposing factors. The peak incidence during the raining season at the end of the year indicated a possible relationship between AGE and seasonal type of virus infection. Prevention in the form of proper hygiene at the household level probably will prove to be useful.

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