Burden of Acute, Persistent and Chronic Diarrhea, Thailand, 2010

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Background: *The incidence of diarrhea in Thai children under five years of age increased over the last decade while mortality dramatically decreased. To evaluate the effectiveness of MCH services under Universal Coverage Schemes, health outcomes should be performed.*
Objective: *To assess the burden and pattern of childhood diarrheal diseases in Thai children under five.*
Materials and Method: *The information on Intestinal Infectious Diseases ICD10: A00-A09 was divided into two groups: 1. Infectious diarrhea: A04, A05, A08, A09 and 2. Dysentery: A02, A03. The authors investigated the number of OPD visits, IPD, mortality, length of hospital stay and co-morbidity of severe cases.*
Results: *The burden of diarrhea was: 3.7 million (1:1) episodes, 756,552 OPD visits (1:5), 124, 403 IPD admissions (1:30), 202 (1:18,460) persistent diarrhea and 48 (1:77, 685) deaths. Diarrheal incidence had two peaks: cool season and early rainy season. Admissions lasted a collective 309,398 days. Diarrhea was persistent in 202 episodes (1.6 per 1,000 admissions) and the associated factors included: age, sepsis, anemia, chronic diseases, malnutrition and HIV. The risks for diarrhea-related mortality included: infant, septicemia and dehydration.*
Conclusion: *The incidence of diarrhea was higher than expected albeit mortality was low. The mortality rate was associated with age under one year, persistent diarrhea, septicemia, chronic and underlying diseases.*

Keywords: *Burden of acute diarrhea, Persistent diarrhea, Chronic diarrhea*

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Diarrhea disease is a major cause of morbidity and mortality among infants and children worldwide. In developing countries, diarrhea accounts for an estimated 17.5-21% of deaths in children under 5 years (equivalent to 1.5 million deaths per year)[1]. This report also estimated the childhood diarrheal mortality in Thailand to be 266 deaths in 2008[1]. The WHO and United Nations' Millennium Development Goal aimed to reduce childhood mortality by two-thirds between 1990 and 2015 (UNICEF/WHO, 2008). Indeed, in recent years, the morbidity and mortality associated with diarrhea have decreased worldwide, associated with health and economic development.

In Thailand, the burden of severe diarrhea (*i.e.*, diarrhea that requires hospitalization) remains high. A report from the Bureau of Epidemiology, Ministry of Public Health, Thailand in 2010, revealed that the incidence of diarrhea in children under five years increased from 7,140.9 cases in 2000 to 10,000 cases per 100,000 population in 2010 while the diarrhea-related mortality rate decreased from 0.35 deaths per 100,000 population in 2001 to 0.10 per 100,000 population in 2012. Twelve percent of diarrhea episodes required hospitalization[2]. To achieve the United Nation Millennium Development Goal especially for maternal and child health (MCH) to reduce diarrheal disease burden, a strong health service system is required.

The strength of any country's health system is reflected by its health outcomes. Several socio-political factors have changed in the last two decades in Thailand, which have affected healthcare, such as the National Health Act and the Universal Health Care Coverage. Since 2002, Thailand has three main public health financing schemes covering 96 percent of total population namely: the Universal Coverage Scheme (UC), the Civil Servant Medical Benefit Scheme (CSMBS) and the Social Security Scheme. The equity

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of coverage in terms of MCH services proved to be high throughout the country, resulting in a fairly equitable distribution of MCH services[3].

One of the MCH services is the prevention and treatment of diarrheal disease. It is time to evaluate the health outcomes a decade after implementation of these health schemes. The objective of the present study was to assess the burden and pattern (*i.e.*, morbidity, severity, seasonal variations in outbreaks and mortality) of diarrheal disease in children under five years in Thailand in the year 2010.

Material and Method

The present study is part of the "Health Situation Analysis of Thai People 2010: Implications for Health Education and Health Service Reform" described elsewhere. The authors analyzed both in-patient and out-patient data from the three national insurance schemes in 2010. The information on Intestinal Infectious diseases: A00-A09 (according to ICD tabulation list, the 10th Revision) were sought out and analyzed for number of OPD visits, IPD admissions, length of hospital stay and mortality rate using sub-group classifications by age.

The rate of monthly incidence of both OPD and IPD were demonstrated in order to detect the possibility of any seasonal variation of diarrheal incidence. The severity for each episode of diarrheal admissions as classified by the duration of hospital stay (*i.e.*, acute diarrhea: less than 14 days, persistent diarrhea: 14-28 days and chronic diarrhea: more than 28 days) were also explored in order to ascertain the severity as related to mortality and the association of co-morbidity with persistent and chronic episodes. The denominator used in the calculation of hospital admission rate and death was from UC and CSMBS Schemes (as the Social Security Scheme did not cover children under 15). For OPD visits, only the number of children under the UC sheme was used as that was the only data available.

Results

Burden of illness of intestinal infectious diseases A00-A09 (ICD 10)

Data in 2010 regarding overall intestinal infectious disease admissions of children and adolescents, as classified by age group, revealed that the leading cause of both admissions and deaths for all age groups was from category A09 (Diarrhea and gastroenteritis of presumed infectious origin). This diagnosis comprised 80-85% (150,606/178,812 admissions and 50/63 deaths) of all of the data. This non-specific diagnosis may be due to lack of available or unreliable diagnostic tests for this symptom; most physicians may have relied upon clinical signs and symptoms to make the diagnosis. The other non-specific diagnosis included: A08 (viral and other specified intestinal infections); A04 (other bacterial intestinal infections) and A05 (other bacterial food borne intoxications not elsewhere); for which the respective morbidity/mortality were 11,157/2 and 6,380/5 and 5,866/0. The non-specific diagnosis of infectious diseases (A09, A08, A04 and A05) comprised more than 97% (174,009/178,812 episodes) of reported cases. The more specific diagnosis for intestinal infectious diseases (*i.e.*, A01: Typhoid and paratyphoid fevers, A06: Amoebiasis, A02 other Salmonella infection, A03: Shigellosis, A00: Cholera and A07: other protozoal intestinal diseases) had a respective morbidity/mortality of 2,189/0, 1,083/0, 1,073/3, 241/1, 111/0 and 106/2 number of admissions/deaths is shown in Table 1.

Since intestinal infections are prevalent in children under 5 years worldwide, the analysis of the 2010 data to determine the proportion of admissions and mortality of intestinal infection as compared to other disease groups, as per the ICD 10 categorization. The proportion of admission of intestinal infectious diseases (A00-A09) ranked second after respiratory tract infection (124,975 admissions) in 2010 and was the tenth leading cause of mortality (49 deaths).

The majority of non-specific diagnosis of intestinal infectious diseases (ICD 10: A04.A05, A08 and A09) was used to represent infectious diarrhea. The other smaller groups-A02 (other salmonella infection) and A03 (Shigellosis) were classified as dysentery diarrhea.

Infectious diarrhea (A04, A05, A08, A09)

Diarrhea out- patients department visits (OPD)

The UC scheme recorded 228,497, 250,317, 131,294, 86,094 and 60,350 diarrhea OPD visits with per 1,000 population of 344.7, 349.1, 177.9, 115.3 and 80.9 for pediatric patients 1, 2, 3, 4 and 5 years of age, respectively (Table 2).

The rate of OPD visits was highest during the first two years of life, but declined with increased age (Fig. 1). The peak incidence of diarrhea was between six and eighteen months of age (Fig. 2).

Diarrhea in-patient department admissions (IPD)

In 2010, there were 124,403 admissions with:

Table 1. Number of admission of intestinal infectious diseases A00-A09 (ICD 10) and death and death rates by age group of Thai children and adolescent in 2010

	Age group													
	Number			0-1 yr.			1-5 yr.			6-12 yr			13-18 yr		
	Total	Death		Total	Death		Total	Death		Total	Deathq		Total	Death	
	n	n	%	n	n	%	n	n	%	n	n	%	n	n	%
A00-A09 Intestinal infectious diseases															
A09 Diarrhea and gastroenteritis of presumed infectious origin	150,606	50	0.03	37,074	30	0.10	71,497	13	0.02	27,404	2	0.0	14,631	5	0.03
A08 Viral and other specified intestinal infections	11,157	2	0.02	3,307	1	0.03	5,730	0	0.00	1,639	0	0.0	481	1	0.20
A04 Other bacterial intestinal infections	6,380	5	0.10	1,793	3	0.20	2,746	1	0.04	1,265	1	0.1	576	0	0.00
A05 Other bacterial foodborne intoxications not elsewhere	5,866	0	0.00	181	0	0.00	2,075	0	0.00	2,364	0	0.0	1,246	0	0.00
A01 Typhoid and paratyphoid fevers	2,189	0	0.00	52	0	0.00	357	0	0.00	959	0	0.0	821	0	0.00
A06 Amoebiasis	1,083	0	0.00	283	0	0.00	413	0	0.00	280	0	0.0	107	0	0.00
A02 Other salmonella infections	1,073	3	0.30	589	2	0.30	285	0	0.00	132	1	0.8	67	0	0.00
A03 Shigellosis	241	1	0.40	54	1	1.90	96	0	0.00	70	0	0.0	21	0	0.00
A00 Cholera	111	0	0.00	19	0	0.00	49	0	0.00	25	0	0.0	18	0	0.00
A07 Other protozoal intestinal diseases	106	2	1.90	19	0	0.00	45	0	0.00	32	1	3.1	10	1	10.0

42,355, 39,816, 20,026, 13,131 and 9,075 admissions with 34, 7, 3, 2 and 2 deaths at 1, 2, 3, 4 and 5 years of age, respectively. The admissions rate were 62.8, 54.1, 26.3, 16.9 and 11.6 per 1,000 population and the mortality rate was 5, 1, 0.4, 0.3 and 0.3 deaths per 100,000 population for children age 1, 2, 3, 4 and 5 years of age, respectively with the average of 1.28 per 100,000 population (Table 3) (Fig. 1).

The peak rate of hospital admission was infants and children between 6 to 15 months old (Fig. 2). This trend indicated that infants are vulnerable to have symptomatic disease leading to severe symptoms and death.

Seasonal variation of the incidence of diarrhea

The monthly incidence of diarrheal OPD visits and IPD admissions in 2010 indicated that diarrhea occurred throughout the year but with increased frequency during the cool weather between November and February and during the early rainy season between May and July (Fig. 3). The reason for the outbreak during the months with cool weather was mainly due to viral infections, especially rotavirus. The reason for the rainy season peak remains unclear.

Duration of hospital stay of infectious diarrhea

In 2010, 83% of total admissions remained in hospital 3 days or less and 99% less than 7 days. There were 1,138 patients admitted for more than 8 days but less than 14 days. These groups of diarrhea patients were considered as having acute diarrhea with a mortality of 0.36 per 1,000 admissions (45 cases died). The number of patients hospitalized longer than 14 days (but less than 28 days) were classified to have persistent diarrhea. There were 139 cases of in-patient persistent diarrhea with 1 mortality for a rate of 7.2 per 1,000 admissions.

The most severe forms of diarrhea resulted in the longest hospitalization (more than 28 days) and were classified as chronic diarrhea. The numbers of admissions were 63 cases with 2 deaths (rate 31.7 per 1,000 admissions). The overall numbers of total

Table 2. Number of OPD visits of intestinal infectious diseases (diarrhea) (ICD 10: A04, A05, A08 and A09) and rate per 1,000 Thai children under five years in 2010

Age (year)	1	2	3	4	5
A04 Other bacterial intestinal infections	3,614	4,014	2,345	1,555	1,162
A05 Other bacterial foodborne intoxications not elsewhere	5,724	10,477	7,474	5,801	4,693
A08 Viral and other specified intestinal infections	23,564	23,155	11,393	7,540	4,921
A09 Diarrhea and gastroenteritis of presumed infectious origin	195,595	212,671	110,082	71,198	49,574
Total OPD visits	228,497	250,317	131,294	86,094	60,350
Population covered by UC schemes 2010	662,944	717,039	737,870	746,410	746,243
OPD visits rate per 1,000 children	344.7	349.1	177.9	115.3	80.9

Table 3. Number and rate by age (in years) of diarrheal admission (ICD10: A04, A05, A08 and A09) per 1,000 and mortality per 100,000 Thai children under five years in 2010

Age (year)	1	2	3	4	5
A04 Other bacterial intestinal infections	1,793	1,271	637	486	352
A05 Other bacterial foodborne intoxications not elsewhere	181	514	585	518	458
A08 Viral and other specified intestinal infections	3,307	3,014	1,362	828	526
A09 Diarrhea and gastroenteritis of presumed infectious origin	37,074	35,017	17,442	11,299	7,739
Total admission	42,355	39,816	20,026	13,131	9,075
Total mortality	34	7	3	2	2
Population covered by UC and Civil Servant Medical Benefit Schemes (CS MBS) 2010	674,293	736,323	761,343	775,648	781,289
Admission rate per 1,000 children	62.8	54.1	26.3	16.9	11.6
Mortality rate per 100,000 children	5.0	1.0	0.4	0.3	0.3

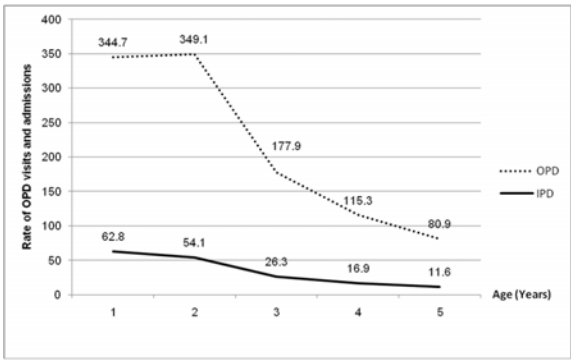

Fig. 1 Rate of diarrheal OPD visits and IPD per 1,000 children by age group of Thai children under five years in 2010

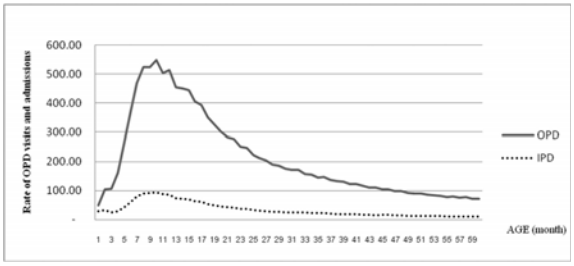

Fig. 2 Rate of diarrheal OPD visits and IPD per 1,000 Thai children under five years by age (in months) in 2010

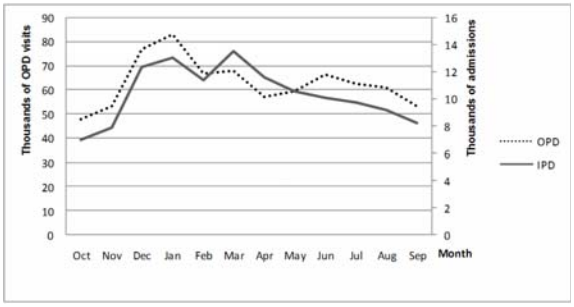

Fig. 3 Number of diarrheal OPD visits and in-patient admissions (IPD) of Thai children under five years in 2010 by month

admissions for this age group were 309,398 days for an average of 2.5 days per admission. The majority of diarrheas among young children were acute and self-limited. Patients hospitalized longer usually have underlying disease(s) or associated diseases (Table 4).

Co-morbidities (secondary diagnosis: ICD10) related to both persistent and chronic diarrhea analyzed by primary diagnosis (ICD 10), sex and patients' age were also investigated. There were no significant difference with regard to type of primary diagnosis and sex. The numbers of infants under one year of age were significantly higher among those with persistent and chronic diarrhea when compared to older children (Table 5).

When the co-morbidity (or secondary diagnosis) of those with persistent and/or chronic diarrhea were analyzed to determine whether the disease(s) might explain the association with a longer hospital stay. The descending rank of co-morbidity of persistent and chronic diarrhea is shown in Table 6.

Co-morbidity associated with diarrhea-related death

Among the 48 diarrhea-related mortalities, the most common primary diagnosis was A09 (43 cases, 89.5%), followed by other A04 (4 cases) and A08 (1 case). The reported co-morbidities reveal that other septicemia (A41) was a major condition associated with diarrhea-related death in 22 of 48 (45.8%) reported deaths. The other potential co-morbidities were: volume depletion (E86) and disorders of fluid and acid-base balance (E87) with 4 cases each (Table 7).

Dysentery diarrhea ICD 10 (A02, A03)

Dysentery OPD, IPD and mortality

The UC scheme recorded 2,051, 2,253, 1,230, 833 and 549 dysentery-related OPD visits for a respective per 1,000 population rate of 3.1, 3.1, 1.7, 1.1 and 0.7 for patients of 1, 2, 3, 4 and 5 years of age. The respective number of dysentery admissions and rate per 1,000 population for children of 1, 2, 3, 4 and 5 years of age was 643, 203, 75, 57 and 46 and 1.0, 0.3, 0.1, 0.1 and 0.1. Both the OPD and IPD rates were highest in the first two years of life but declined with increased age (Table 8).

Seasonal variation of dysentery incidence

Dysentery occurred throughout the year but with two distinct peaks in OPD visits: during cool months (December to February) and early rainy season (June and July). The IPD showed a significant peak in admissions during the rainy season (July and August). Not with standing, the number of either OPD or IPD was too small vis-a-vis the number of cases of infectious diarrhea to draw any strong conclusions as to the reason for this peak (Fig. 3).

Mortality and duration of hospital stay due to dysentery

Two IPD cases of salmonella infection (A02) and one of shigellosis (A03) died in hospital. All of the

Table 4. Number and rate of diarrheal admission and deaths by duration of admission in days and severity of illness of Thai children under five in 2010

Days	Number of Admissions	%	Number of Deaths	Mortality per 1,000 Admissions	Severity
1	32,914	26.5	24		
2	44,747	36.0	8		
3	25,493	20.5	4		
4	11,676	9.4	1	0.36	Acute
5	4,925	4.0	1		
6	2,196	1.8	1		
7	1,112	0.9	-		
8-14	1,138	0.9	6		
15-21	106	0.1	1	7.2	Persistent
22-28	33	0.0	-		
>28	63	0.1	2	31.7	Chronic

Table 5. Duration of hospital stay (days), number of persistent and chronic diarrhea by diagnosis (ICD 10: A04, A08 and A09), Sex and Age group of Thai children under five years in 2010

Days	ICD10			Sex		Age group			
	A04	A08	A09	Male	Female	0-7 d	8-28 d	29 d-12 m	1-5 y
15-28	12	6	121	85	54	1	9	63	66
>28	4	4	55	35	28	-	-	26	37

Table 6. Number of persistent and chronic diarrhea and their co-morbidity (Secondary diagnosis) (ICD 10) in Thai children under five years in 2010

Co-morbidity (ICD 10)	Type of diarrhea	
	Persistent	Chronic
Fluid and Electrolyte imbalance (E83, E86 ,E87)	35	17
Other septicemia (A41,A49,P36)	15	2
Anemia (D50,D56,D64)	15	9
Congenital malformations (Q21,Q33,Q43,Q90)	12	2
Cardio-Pulmonary diseases (I27,J00,J06,J15,J18,J20,J44,J45)	11	6
Malnutrition (E42,E43, E44,E46)	5	3
Gastro intestinal and chronic liver (K21,K56,K63,K74)	5	3
Other intestinal infection (A02, A03,A08)	4	2
Endocrine disorder (E03, E11,E21,E23)	3	2
Candiasis and mycosis (B37,B49)	3	-
HIV disease (B24)	2	-
Others	17	5
No report	12	12
Total	139	63

deaths were children under one year of age (resulting in a rate of 4.7 per 1,000 admissions or 0.4 per 100,000 population) (Table 8). For dysentery, 811 cases (79.1%) were admitted for less than 7 days, while 944 cases (92.2%) were admitted for less than 14 days and were classified as acute illness. All 3 deaths due to dysentery occurred during this period. There were 57 (5.7%) and 23 (2.3%) respective cases that stayed longer than 14

Table 7. Number of diarrheal mortality and co-morbidity (secondary diagnosis) (ICD10) by age group of Thai children under five years in 2010

Co-morbidity (ICD 10)	Admission age (year)					Total
	1	2	3	4	5	
A41 Other septicemia	17	3	1	1	0	22
B96 Other bacterial agents as the cause of diseases	1	0	0	0	0	1
D50 Iron deficiency anemia	1	0	0	0	0	1
D62 Acute post-haemorrhagic anemia	0	0	0	0	1	1
D64 Other anemias	1	0	0	0	0	1
D65 Disseminated intravascular coagulation	0	0	0	0	1	1
E03 Other hypothyroidism	0	0	1	0	0	1
E83 Disorders of mineral metabolism	1	0	0	0	0	1
E86 Volume depletion	1	2	0	1	0	4
E87 Other disorders of fluid electrolyte and acid-base	3	1	0	0	0	4
I46 Cardiac arrest	1	0	0	0	0	1
J20 Acute bronchitis	1	0	0	0	0	1
J21 Acute bronchiolitis	2	0	0	0	0	2
K74 Fibrosis and cirrhosis of liver	1	0	0	0	0	1
N17 Acute renal failure	0	1	0	0	0	1
Q03 Congenital hydrocephalus	0	0	1	0	0	1
Q43 Other congenital malformations of intestine	1	0	0	0	0	1
No report	3	0	0	0	0	3
Total	34	7	3	2	2	48

Table 8. Number of OPD visits and IPD of dysentery diarrhea (ICD 10: A02, A03) and rate per 1,000 and mortality per 100,000 Thai children under five years in 2010

Age (year)	1	2	3	4	5
OPD					
A02 Other salmonella infections	600	581	358	287	189
A03 Shigellosis	1,451	1,672	872	546	360
Total OPD visits	2,051	2,253	1,230	833	549
OPD visits rate per 1,000 children	3.1	3.1	1.7	1.1	0.7
IPD					
A02 Other salmonella infections	589	162	58	34	31
A03 Shigellosis	54	41	17	23	15
Total admission	643	203	75	57	46
Total mortality	3	0	0	0	0
Admission rate per 1,000 children	1.0	0.3	0.1	0.1	0.1
Mortality rate per 100,000 children	0.4	-	-	-	-

days and classified as persistent and chronic cases (Table 9).

Discussion

Hospital-based data derived from three national health insurance schemes were analyzed to estimate the burden of infectious diarrhea among Thai children under five years of age. The information on hospital admission and in-hospital mortality is estimated to be proximate to the real burden of illness. In Thailand, universal health coverage was achieved in 2002. Ambulatory and hospital care were available for the rich and the poor through geographic wide spread networking of government health facilities. The number of OPD cases may be underestimated. For mild diarrhea, people might be seeking medical service from the public primary care health service or private clinic, which would be more convenient and nearer their home than

Table 9. Number and rate of dysentery diarrhea admissions, deaths and rate per 1,000 admissions by duration of admission in days and severity of illness of Thai children under five years in 2010

Days	Number of Admissions	%	Number of Deaths	Mortality per 1,000 Admissions	Severity
1	76	7.4	1		
2	152	14.8	-		
3	186	18.2	-		
4	145	14.2	-		
5	114	11.1	1	3.2	Acute
6	70	6.8	-		
7	68	6.6	-		
8-14	133	13.0	1		
15-21	46	4.5	-	-	Persistent
22-28	11	1.1	-		
>28	23	2.2	-	-	Chronic

a secondary or tertiary hospitals. The data on patients with symptomatic mild cases who did not seek medical service from a hospital were not available or considered incomplete or unreliable. It has been estimated that children under five years will be affected by 1 episode of diarrhea per child per year[4]. The estimated incidence of diarrhea per year in this age group covered by two of the three national health schemes was 3.7 million (risk = 1:1): out-patient visits numbered 756,552 plus OPD under the CSMDS scheme (data unavailable) (risk = 1:5); hospital admissions 124,403 (risk = 1:30) with 202 cases of persistent diarrhea (risk = 1:18,460) and 48 deaths (risk = 1:77,685) (Fig. 4).

The incidences of OPD visits were 20,938 visits per 100,000 population which were much higher than official reports of 10,000 per 100,000 population. The diarrheal incidence had its peak during the first two years of life and declined with increased age with the seasonal variation of incidence of two peaks in cool months and early rainy season. The timing of these two peaks was the same in several longitudinal studies and a national epidemiology report[2,5]. It has been confirmed that in Thailand and countries in South East Asia, 43%-56% of diarrhea admissions of children under five years old, the causative agent is rotavirus[5,6]. The season outbreaks of rotavirus during the cool months are similar worldwide. In infants, natural rotavirus infection conferred protection against subsequent infection and this protection increases with each new infection and reduces the severity of illness[7]. This may partly explain the epidemiological pattern of high incidence of this disease with severe symptomatic episodes in children under two years old and then declining with increased age. The other peak incidence

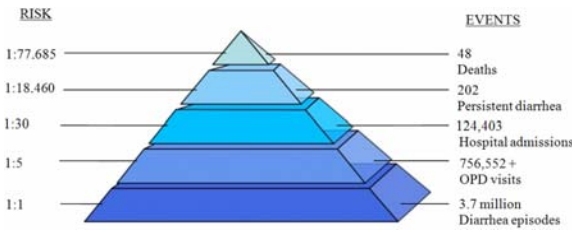

Fig. 4 Summary of diarrheal disease burden of Thai children under five years under coverage of the National Insurance Schemes in 2010

of diarrhea in rainy season may be partly explained by the dysentery peak in Fig. 3 of the present study and information from shigellosis study in Thailand[8]. A bigger longitudinal study may need to verify this hypothesis. The causative agents of diarrhea in children have also changed in the last decade. Non-typhoidal salmonella has become the leading causes of bacterial diarrhea throughout the country and shigella species have shifted from *S. flexneri* to *S. sonnei* just like in developed country[8-10].

The overall diarrhea (A00-A09) in-hospital mortality was (51 deaths) 1.36 per 100,000 population while the reported Mortality Statistics[2] was (86 deaths) 2.36 per 100,000 population which also was much higher than MPH official reports[3] of 0.1 per 100,000 population but was lower than 266 deaths estimated by WHO[1]. Low diarrheal related-mortality may be explained by nationwide available of ORS and ORT in the last two decades.

The incidence of persistent and chronic infectious diarrhea in 2010 was very low with 202 cases, 1.6 episodes per 1,000 diarrheal admissions and 0.026

percent of OPD visits, which was much lower than the global rate of 5-18% of all episodes[11]. The analysis of the associated factors of persistent and chronic diarrhea (including primary diagnosis, sex, age and reported co-morbidity) in order to disclose the possible cause-effect. Age (under one year of age), fluid and electrolyte imbalance, septicemia and anemia, chronic diseases, malnutrition and HIV were associated with the problems. This finding was similar to what has been reported elsewhere[11,12]. Unfortunately, the authors have no data regarding the causative organisms or bacterial overgrowth or trace element deficiencies associated with persistent episodes in the records.

The mortality rates among patients with persistent and chronic diarrhea were significantly higher than those with acute diarrhea vs. acute diarrhea (*viz.*, a respective 7.2 and 31.7 vs. 0.36 deaths per 1,000 admissions). With a small sample of illness, it is difficult to conduct any future hospital-based study to identify the causal relationship associated with prolonged hospital stay and diarrheal disease in Thailand. The major factors for diarrhea-related mortality were: age (less than one year) and other co-morbidities (*i.e.*, septicemia, severe dehydration and fluid and electrolyte imbalance), which coalesce to create a vicious cycle of childhood diarrhea, malnutrition, prolonged duration and more risk for additional infections either acquire in hospital or community. With underlying chronic diseases (*i.e.*, HIV infection and organ failure), the condition of the pediatric patients will deteriorate.

The results for dysentery were similar to those for infectious diarrhea, *viz*., peaking in patients under two years of age (mortality rate of 0.4 per 1,000 admissions). The incidence of persistent diarrhea and chronic diarrhea were each 8% of total admissions, which was much higher than for infectious diarrhea. The interesting finding was that the peak of incidence for severe cases required admission occurred during the rainy season, confirming a previous study[8] albeit the explanation for this peak in dysentery remains unclear.

With regard to medical economics, the reported overall duration of diarrheal hospitalizations among Thai children under five years was 309,398 days (average = 2.5 days/admission), for a total of 351,340,573 Thai bahts (US$ 11,711,352) in hospital charges (average = 2,824 bahts (US$ 95)/admission).

By preventing this common disease, morbidity, hospitalization and mortality can be avoided. Avoiding admission means having hospital beds and budget available for critically ill persons. In addition to health education, good community and individual hygiene, new effective proven technologies are available but costly (*i.e.*, rotavirus vaccine)[13]. Most of diseases are country-specific and/or are related to hygiene and social behaviors and environment, further studies are needed to examine the determinants, causative agents and cost-effectiveness of the new preventative and treatment technologies in the Thai context.

Study limitations

In the present study, we analyzed data from primary through tertiary care hospitals throughout the country. The reliability and validity of our results depend on correct medical diagnosis and coding: a misclassification bias may have occurred. Moreover, the analysis by disease grouping after preview the data may have resulted in an expectation bias. Caution should therefore be exercised when extrapolating the results.

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Potential conflicts of interest

None.

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ภาระโรคอุจจาระร่วงเฉียบพลัน ยีดเยื้อและเรื้อรังในประเทศไทย พ.ศ. 2553

สุมิตร สุตรา, เพ็ญศรี โควสุวรรณ, อรุณ จิระวัฒน์กุล, แก้วใจ เทพสุธรรมรัตน์

ภูมิหลัง: *อุบัติการณ์ของโรคอุจจาระร่วงในเด็กไทยเพิ่มขึ้นอย่างมากในรอบสิบปีที่ผ่านมาขณะที่อัตราตายลดลงอย่างชัดเจน เพื่อประเมินผลของโครงการดูแลสุขภาพของแม่และเด็กภายใต้หลักประกันสุขภาพแห่งชาติ จำเป็นต้องประเมินผลลัพธ์ของสุขภาพเด็ก*

วัตถุประสงค์: *เพื่อประเมินภาระโรคและรูปแบบของโรคอุจจาระร่วงในเด็กอายุต่ำกว่าห้าปีในประเทศไทย*

วัสดุและวิธีการ: *ข้อมูลจากฐานข้อมูลโรคติดเชื้อทางเดินอาหารในปี พ.ศ.2553 ICD10:A00-A09 ถูกวิเคราะห์โดยแยกเป็นสองส่วน 1) โรคอุจจาระร่วงจากการติดเชื้อ: A04, A05, A08, A09 และ 2) โรคบิด: A02, A03, โดยวิเคราะห์หาจำนวนของผู้ป่วยที่มารับการรักษาแบบผู้ป่วยนอก ผู้ป่วยใน การเสียชีวิตจำนวนวันนอนโรงพยาบาลและโรคที่เป็นร่วมกับการเจ็บป่วยรุนแรงและเสียชีวิต*

ผลการศึกษา: *จำนวนครั้งของการป่วยและอัตราป่วยต่อประชากร: 3.7ล้านครั้ง (1:1) ผู้ป่วยนอก 756,552 ครั้ง (1:5) ผู้ป่วยใน 124,403 ครั้ง (1:30) อุจจาระร่วงเรื้อรัง 202 ครั้ง (1:18,460) เสียชีวิต 48 คน (1:77,685). โรคนี้มีอุบัติการณ์สูงสองครั้งในช่วงฤดูฝนและฤดูหนาว อัตราการครองเตียงรวม 309,398 วัน ผู้ป่วยอุจจาระร่วงเรื้อรัง 1.6 ครั้งต่อการป่วยในโรงพยาบาล 1,000 ครั้ง โดยมีปัจจัยร่วมคืออายุ การติดเชื้อในกระแสเลือด ภาวะซีด โรคเรื้อรังทุโภชนาการและ HIV ความเสี่ยงที่สัมพันธ์กับการเสียชีวิตคือ อายุน้อยกว่า 1 ปี การติดเชื้อในกระเลือด และการขาดน้ำ*

สรุป: *อุบัติการณ์ของโรคอุจจาระร่วงสูงกว่าในรายงานมาก แต่อัตราตายค่อนข้างต่ำ โอกาสของการเสียชีวิตขึ้นอยู่กับวัยทารก การเจ็บป่วยเรื้อรังและการเกิดโรคร่วม*